

Parry's book. Incidentally the question of what is brandy is elucidated by what is stated respecting the nature of artificial cognac oil, which, however, strictly speaking, is not an essential oil. There is, as the author says, an almost unlimited field of research in the synthetic production of perfumes. The field is still practically untilled, and a rich harvest awaits the successful cultivator.

It is, however, a moot point whether any individual synthetic perfume is the equal, from the perfumer's point of view, of the corresponding natural perfume. Some of these synthetic perfumes in the pure or concentrated state in no wise resemble the natural variety; in fact, in this state they are almost repellent, and it is only when judiciously blended and diluted that their fragrance becomes pleasurable.

The fragrance of a natural perfume is in all probability not wholly due to a single substance or a single stimulus. Some one substance may be there in relatively large proportion, but associated with it are other odoriferous substances, some of them, possibly, in minute amounts only, but all of them contributing to an olfactory sensation which gives pleasure. A perfume, in fact, is like a piece of music. There may be in the piece a dominant musical idea, but the pleasure it creates is largely dependent upon its association with tone-sensations which are not necessarily structural parts of the dominant idea. Synthetic perfumes, therefore, can only successfully replace natural perfumes when the greatest care and judgment are exercised in blending. This kind of blending rises to the level of a fine art. To be successful in its exercise the olfactory sense of the blender requires a training hardly less rigorous than that required by the auditory sense of the musician.

This work, with all its limitations, is still the most complete treatise on the subject in our language, and as such is indispensable to the pharmacist, the perfumer, as well as to the analytical chemist who may be concerned with the examination of a class of substances of varying character and peculiarly liable to sophistication.

A MONOGRAPH ON THE FROG.

Der Frosch. Monographien einheimischer Tiere.
Band i. By Dr. F. Hempelmann. Pp. vi+201.
(Leipzig: W. Klinkhardt, 1908.) Price 4.80 marks.

THIS monograph, the editor informs us, has arisen in connection with elementary biological teaching at Leipzig, and is intended to describe not only the habits, structure, and development of "the physiologist's domestic animal," but to form an introduction to physiology, psychology, the mechanics of development, classification, and distribution. It is in respect of its scope that this addition to the vast literature on the frog differs from its predecessors. At the same time it is written for beginners, and must be judged from its value as an introductory handbook to practical dissection and experiment.

We may say at once that taken as a whole it is a well-written and successful attempt to compress all that is important and well established concerning the

frog into 200 pages. But that is far more than an elementary student can assimilate, and between what he is first to notice and what he will only notice after the primary difficulties are overcome there is no means of distinguishing.

We regret that no mention is made of Marshall's famous book, and also that figures taken from his works are borrowed merely from reproductions of them by other authors. This neglect of Marshall is, however, no isolated case of the omission of some of the most important English works on the frog, both educational and other. There is surely no more important work on the distribution and systematic aspect of Amphibia than Boulenger's "Tailless Batrachians," nor is there a more readable account of the various aspects of this very animal than that by Holmes, published some two years ago. Lister's classical researches on the pigmented cells are nowhere referred to, whilst a small and almost unknown compilation by St. John Mivart more than thirty years old is quoted.

The first section, that on anatomy, is based on Gaupp's well-known edition of Ecker's work. Histology begins on p. 6, and the student is plunged into a study of the structure of the integument before the terms "cell," "transverse section," and "gland" are made clear. The apparently inevitable and complicated nomenclature reaches its maximum in connection with the brain, where no fewer than four sets of terms are used for each region. The difficult and complicated question of how the heart distributes arterial and venous blood requires a fuller sketch of the heart itself than is given on p. 54; whilst the equally difficult problems of development, e.g. of what are meant by "pronephros" and "mesonephros," are scarcely alluded to. The writer does not seem to appreciate the difficulties of beginners in regard to these unfamiliar conceptions.

The second section—physiology—is much better done, and the general features of metabolism are clearly explained. Then follow sections on heat-production, colour-change, movements, and the elementary physiology of muscle and nerve, leading up to a discussion of psychology and the development of consciousness. Some account is given of the experimental side of development, in which, however, we miss any reference to Assheton's work on the growth of different regions; in fact, the phenomenon of growth does not appear to be treated anywhere in the book. The references to sex-determination (pp. 162-4) in our present ignorance are inconclusive, and might well have been omitted.

Lastly, we come to "Biologie" (it is difficult to see why this, the most interesting part of a treatise, is always put at the end by German writers) and classification. Here we must agree to differ from the author. The common brown grass frog has always been *Rana temporaria* to us, but to find it described as *Rana muta laurenti* is indeed a shock. There is really no good ground for this change. The tendency needlessly to upset well-established names is a most regrettable feature of systematists; but to introduce confusion without any right, explanation or apology into a book

intended for elementary students is really an offence. We recommend the remarks of Boulenger ("Tailless Batrachians of Europe," Ray Society, p. 301) to the author.

MODERN ORGANIC CHEMISTRY.

Recent Advances in Organic Chemistry. By Dr. A. W. Stewart. With an introduction by Prof. J. N. Collie. Pp. xv+296. (London: Longmans, Green and Co., 1908.) Price 7s. 6d. net.

UNLESS the chemist, and especially the organic chemist, adopts some elaborate system of grouping together new information as it appears, the mass of research which nowadays floods the journals makes it difficult for him to keep abreast of current investigations.

The reports of the British Association on organic chemistry have served a most useful purpose in giving summaries of recent work; but they are too few in number. It appears to us that if the Association's funds could be utilised in extending this part of its activities, they would be well spent. Three or four reports a year on different branches of chemistry would be invaluable. But until we have something of this kind we must rely on individual effort to supply the want. This, we take it, is the main object which Dr. Stewart had in view in writing his book, and we congratulate him on the result, which has taken the form of a compact, neatly bound and well-printed volume at a very moderate price. The compilation has been carried out with great discrimination. It is not an easy matter to discuss details of modern structural formulæ and at the same time to sustain the interest of the reader. But Dr. Stewart has an easy and pleasant style, and, if his criticisms are occasionally rather forcible, they only add piquancy to the subject under discussion.

We think the author takes too despondent a view of the present trend of organic chemistry. We are, it is true, deluged with new compounds, which seem destined to bear no fruit, but the worst that can be said of them is that they add to the bulk of our already ponderous journals.

Nor are we of the author's opinion in thinking that "we have accumulated an immense mass of data concerning the results of reactions, but very little indeed with regard to their causes." The very volume before us serves to negative the statement, for the book bristles with facts upon which theories are based.

We do, however, most heartily agree with him in emphasising the need for studying exceptions to general theories, and there is no doubt that therein lies a fruitful field of study. Our knowledge of the mechanism of most, even of the simplest, reactions is incomplete. We know the end result, but not the intermediate steps. Moreover, there is scarcely any general reaction which is not modified to some extent in its individual applications, whereby we are forced more and more to recognise reactivity as a function of environment. But surely this is no cause for discouragement. There are still new worlds to conquer, and perhaps Dr. Stewart's book may induce chemists to give their attention to these neglected problems.

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That the author appears a little impatient of those whose attitude towards new theories is hesitating, and perhaps conservative, is perhaps natural. But it must be remembered that our mechanical concepts of atomic relations are not easy of proof, and dynamical concepts much less than statical ones. Van 't Hoff's theory has afforded overwhelming evidence of the value of the statical idea, for it is the very essence of stereochemistry, and fits in admirably with the theory of atomic linking and the existence of dynamic isomers. The foundations of organic chemistry are laid on a statical basis. It is only natural, therefore, that the explanation of the physical properties of compounds should bear a direct relation to this fundamental idea. No one doubts that the statical concept is an incomplete one. It is equally certain that the whole story of molecular forces will only be known when physical and chemical properties are grouped under one comprehensive idea. But there is no reason why new theories should not be grafted on the old, deep-rooted stock, until it may be safely transplanted. We must only be sure that any theoretical development is capable of experimental study, and in this connection it is doubtful if electrons and Faraday tubes, whatever theoretical value the physicist may attach to them, will prove more serviceable to the organic chemist than vortex atoms.

The book is divided into chapters or essays dealing with those topics which have attracted special attention during the last decade. It opens with a good general account of Grignard's reaction and asymmetric synthesis. Then follows a chapter on polyketides, that is, bodies containing the CH_2CO or ketene group or its multiple, which is illustrated from the work of Collie, Staudinger, and Wilsmore. This is followed by a chapter on recent synthetic preparations of cycloparaffins, which the author terms "polymethylenes." There are essays on recent work on the terpenes, alkaloids, and polypeptides. An interesting, though a very brief, account is given on the action of light on organic compounds which embodies much of the work of Ciamician and Silber, and there are chapters on addition reactions and unsaturation, in which the author has something to say about his own investigations. The volume closes with a chapter touching on modern views and the inadequate nature of structural formulæ, and there is, finally, an excellent bibliography of organic chemical literature, which affords convincing testimony of the utility, if not necessity, to all organic chemists of an adequate knowledge of the German language.

J. B. C.

THE CURVATURE METHOD OF TEACHING GEOMETRICAL OPTICS.

Geometrical Optics. By V. H. Mackinney and H. L. Taylor. Pp. iii+128. (Birmingham: J. and H. Taylor.)

THE preface to this little book is somewhat misleading. We there read:—"The growing demand for a book on Geometrical Optics based upon the Curvature system has led to the production of this small volume. . . ." If the use of the curvature